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10/552,796	10/13/2005	Tohru Nakagawa	10873.1444USWO	4482
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EXAMINER				
TADAYYON ESLAMI, TABASSOM				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/552,796

**Applicant(s)**

NAKAGAWA, TOHRU

**Examiner**TABASSOM TADAYYON  
ESLAMI**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 April 2004.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 12-17 and 19-23 is/are pending in the application.  
4a) Of the above claim(s) 1-11, 18, 23 and 24 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 12-17, 19-23 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☒ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10/13/05.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

1. Applicant's election of Group II in the reply filed on 06/12/08 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 1-11, 18, 24-27 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Groups I, III and IV, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 06/12/08.

#### DETAILED ACTION

##### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroshi Kiguchi et al (U. S. Patent Application: 2003/0024103, here after 103).

Claim 12 is rejected. 103 teaches a method for producing a pattern structure [0001 lines 2-5] by making the surface hydrophilic. 103 teaches a method for forming a pattern (wiring) [abstract lines 1-3] in which the surface becomes hydrophilic by discharging a solution in which the organic molecules (organosiloxane) by ink jet printer [0046 lines 5-end]. 103 also teaches for making the surface hydrophilic fluoroalkylsilane can be used rather than organosiloxane [0050 lines 1-5]. The fluoroalkyl changes inherently are dissolved to form the ink in order to form the pattern by ink jet printer. 103

teaches heating the pattern structure in which the solvent inherently evaporates to form patterns containing the organic molecules [0047 lines 3-4]. Although 103 does not teach the surface tension of the discharging solution, however the surface tension of the discharging ink in ink jet nozzles is result effective variable. If the surface tension is very high, then the ink can not drop from the nozzle and if it is very low, then the ink does not stay on the surface [MPEP 2144.05. II B]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to optimized the surface tension of the discharging solution by adjusting the ratio of appropriate solvent to the fluoroalkyl material and get the appropriate surface tension, because the surface tension is result effective variable and has to be optimized.

Claim 13 is rejected. 103 teaches the limitation of claim 12 as discussed above and 103 further teaches the solution further comprising a second pattern formation material(titanium dioxide) [0046 lines 3-end] and the solvent contained in the discharged solution inherently form patterns containing the organic molecules (fluoroalkyl) and the second pattern formation material(titanium dioxide).

3. Claims 12-13 and 15 -16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuaki Yokoyama et al (U. S. Patent Application: 2003/0224152, here after 152).

Claim 12 is rejected. 152 teaches a method of making a conductive film for wiring (forming pattern) [abstract lines 1-5] by discharging a solution (via ink jet printing) [0026 lines 16-end] where the solution comprising fluoroalkyl (first pattern formation material, perfluoroalkyl) [0025] and evaporating the solvent to form a pattern containing organic

molecules [0039 lines 1-7]. Although 152 does not teach the surface tension of the discharging solution, however the surface tension of the discharging ink in ink jet nozzles is result effective variable. If the surface tension is very high, then the ink can not drop from the nozzle and if it is very low, then the ink does not stay on the surface [MPEP 2144.05. II B]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to optimized the surface tension of the discharging solution by adjusting the ratio of appropriate solvent to the fluoroalkyl material and get the appropriate surface tension, because the surface tension is result effective variable and has to be optimized.

Claim 13 is rejected. 152 teaches the limitation of claim 12 and 152 teaches the solution further comprising a second pattern formation material(metal particles) [0025 lines 1-6] and the solvent contained in the discharged solution inherently form patterns containing the organic molecules (perfluoroalkyl) and the second pattern formation material(metal particles).

Claim 15 is rejected. 152 teaches the limitation of claim 13 and 152 teaches the second pattern formation material is a metal [00255 lines 1-4].

Claim 16 is rejected. 152 teaches the second pattern formation material is metal [0025 lines 1-6]. 152 does not clearly teaches the size of the metal particles (being in colloid range), however 152 teaches the thickness of the coating is 0.05-10 micron which clearly teaches the size of the metallic particles have to be less than 0.05-10 micron in which it covers the colloid range. Overlapping ranges are *prima facie* evidence of obviousness. It would have been obvious to one having ordinary skill in the art to

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have selected the portion of [appropriate range] that corresponds to the claimed range. *In re Malagari*, 182 USPQ 549 (CCPA 1974). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of making wiring pattern that 152 teaches where the metal particles are in colloidal range, because 152 teaches the thickness of the conductive layer overlap the colloidal range and the metal particles has to be smaller or equal to the thickness of the film.

4. Claims 12-13, 15, 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over S. Nakamura et al (U. S. Patent Application: 2003/0184613, here after 613).

Claims 12-13 are rejected. 613 teaches a method of forming a pattern by discharging droplets [ 0001] to form organic semiconductor layer comprising fluoroalkyl chains ( polyalkylfluorine) ( first pattern forming material) and polyalkylthiophene( second pattern forming material)[ 0391 lines 1-2 and 3 last lines] and heating the solvent to vaporize and leaves the semiconductor film [0392 lines 1-3]. Although 613 does not clearly teach the solvent comprises fluoroalkyl and polyalkylthiophene, but it is a prima facie of obviousness to combine two compositions each is taught by the prior art to be useful for the same purpose in order to form the third composition useful for the very same purpose [MPEP 2144.06]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of making a pattern that 613 teaches where the droplets contains polyalkylfluorine and polyalkylthiophene, because 163 teaches it is appropriate to deposit polyalkylfluorine and polyalkylthiophene in solvent by ink jet printing method and form a film. Although

613 does not teach the surface tension of the discharging solution, however the surface tension of the discharging ink in ink jet nozzles is result effective variable. If the surface tension is very high, then the ink can not drop from the nozzle and if it is very low, then the ink does not stay on the surface [MPEP 2144.05. II B]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to optimized the surface tension of the discharging solution by adjusting the ratio of appropriate solvent to the optical material and get the appropriate surface tension, because the surface tension is result effective variable and has to be optimized.

Claims 15, 17 and 21 are rejected. 613 teaches the limitation of claim 13 and 613 teaches the second pattern forming material is a semiconductor polymer (polyalkylthiophene) [0039, 3 last lines].

5. Claims 12, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Y. Sunada et al (U. S. Patent Application: 2004/0101645, here after 645).

645 teaches a method of making pattern by ejecting droplets from a nozzle [abstract lines 1-3, 0003] where the ink (ink jet printer) comprising dissolving fluoroalkyl chains in a solvent and apply it on the surface and evaporating the solvent to form a film on the surface [abstract lines 3-end, 0015 lines 6-4]. Although 645 does not teach the surface tension of the discharging solution, however the surface tension of the discharging ink in ink jet nozzles is result effective variable. If the surface tension is very high, then the ink can not drop from the nozzle and if it is very low, then the ink does not stay on the surface [MPEP 2144.05. II B]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to optimized the surface

tension of the discharging solution by adjusting the ratio of appropriate solvent to the fluoroalkyl material and get the appropriate surface tension, because the surface tension of the ink for ink jet printer has to be optimized.

Claim 19 is rejected. 645 teaches the limitation of claim 12 and further teaches the structure has the specific formula as claim 19 required and hydrolyzate of the molecules [0009].

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroshi Kiguchi et al (U. S. Patent Application: 2003/0024103, here after 103), further in view of Satoko Iwato et al (WO/2001/090267, here after 267).

103 teaches the limitation of claim 12 as discussed above. 103 teaches a method of making surface hydrophobic (water repellent, prior to expose to the UV light) by depositing an ink comprising fluoroalkyl chains via ink jet printer on the surface of a substrate [0046, 0050 lines 1-5]. 103 does not teach the fluoroalkyl material has the specific structure that claim 19 requires. 267 teaches a method of making a surface water repellent (hydrophobic) [abstract] and 267 also teaches the composition is  $\text{Rf}-(\text{CH}_2)_p\text{-Si}\{-(\text{OCH}_2\text{CH}_2)_n\text{-OR}\}_3$  where the RF can be more C3 18 perfluoroalkyl groups [ Detailed description of the invention, first paragraph, examples lines 4-9]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of making the surface water repellent as 103 teaches where the fluoroalkyl molecule has composition formula of  $\text{Rf}-(\text{CH}_2)_p\text{-Si}\{-(\text{OCH}_2\text{CH}_2)_n\text{-OR}\}_3$  where the RF can be more C3 18 perfluoroalkyl groups, because 267 teaches this composition is suitable for make a surface water repellent.



7. Claims 15, 20, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroshi Kiguchi et al (U. S. Patent Application: 2003/0024103, here after 103), further in view of Tohru Nakagawa et al (PCT Publication: WO02/081588, and in fact we used the U. S. Patent: 7141305 as the legal translation of that document, here after Nakagawa).

8. Claims 15 and 20 are rejected. 103 teaches the limitation of claim 13 as discussed above. Although 103 teaches the second formation material is a metal oxide (titanium dioxide), however 103 does not teach it is a precursor of titanium dioxide. Nakagawa teaches a method for producing pattern structure (water repellent film) by depositing a solution of organic molecules on a substrate [abstract]. Nakagawa teaches the solution has fluoroalkyl chains dissolved as first pattern formation material and titanium oxide and Nakagawa teaches the metal oxide can be enter to the solution in form of titanalkoxide (metal alkoxide)[ column 4 lines 41-43]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of making the surface water repellent as 103 teaches where the titanium oxide added to the solution as titanalkoxide as Nakagawa teaches, because Nakagawa teaches it is suitable to have the titanium oxide added to fluoroalkyl solution for making water repellent film.

Claim 22 is rejected. 103 and Nakagawa teach the limitation of claim 12 and Nakagawa teaches the solvent is water which has the boiling point of higher than 80C [column 25 line 36].

9. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tohru Nakagawa et al (PCT Publication: WO02/081588, here after Nakagawa), further in view of Hiroshi Kiguchi et al (U. S. Patent Application: 2003/0024103, here after 103).

Claim 12 is rejected. Nakagawa teaches a method for producing pattern structure (water repellent film) by depositing a solution of organic molecules on a substrate [abstract]. Nakagawa teaches the solution has fluoroalkyl chains [column 3 lines 63-66]. Nakagawa teaches the fluoroalkyl chains dissolved as first pattern formation material in a solvent [column 19 lines 26-30]. Nakagawa teaches heating the solution to form a pattern containing organic molecule by evaporating the solvent [column 5 lines 27-30]. Nakagawa does not teach the depositing process is via ink jet printing. 103 teaches a method for producing a pattern structure [0001 lines 2-5] by making the surface water repellent. 103 teaches a method for forming a pattern (wiring) [abstract lines 1-3] in which the surface becomes water repellent by discharging a solution in which the organic molecules by ink jet printer [0046 lines 5-9]. 103 also teaches for making the surface hydrophilic fluoroalkylsilane can be used [0050 lines 1-5]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of making pattern (water repellent) as Nakagawa teaches where the method of applying the solution to the surface is by ink jet printer as 103 teaches, because 103 teaches it is appropriate method to apply the water repellent solution to a surface. Although none of the above references teach the surface tension of the discharging solution, however the surface tension of the discharging ink in ink jet nozzles is result effective variable. If the surface tension is very high, then the ink can

not drop from the nozzle and if it is very low, then the ink does not stay on the surface [MPEP 2144.05. II B]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to optimized the surface tension of the discharging solution by adjusting the ratio of appropriate solvent to the fluoroalkyl material and get the appropriate surface tension, because the surface tension is result effective variable and has to be optimized.

Claim 13 is rejected. Nakagawa and 103 teach the limitation of claim 12 as discussed above and Nakagawa teaches the solution comprising a second pattern formation material (the solvent). Although in evaporation process the solvent evaporates and leaves the solution, however some of the solvent residues always stays in the solution and can be considered the second pattern material.

Claim 14 is rejected. Nakagawa and 103 teach the limitation of claim 13 as discussed above and Nakagawa teaches formation of a pattern structure with the region containing relatively large amount of the first pattern material to the base of the substrate [93, fig. 4] and a region containing relatively large amount of the second pattern formation material (the solvent) [91 fig. 4] on top of the substrate and the first pattern formation material [column 14 lines 38- 44].

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroshi Kiguchi et al (U. S. Patent Application: 2003/0024103, here after 103), further in view of Tohru Nakagawa et al (PCT Publication: WO02/081588, and in fact we used the U. S. Patent: 7141305 as the legal translation of that document, here after Nakagawa), and J. James Stone (U. S. Patent: 5815174, here after Stone).

Claim 23 is rejected. 103 and Nakagawa teach the limitation of claim 12 as discussed above. They do not teach the substrate temperature is less than the discharged solution by at least 5 degree centigrade or more. Stone teaches a method of printing with an ink jet printer [column 1 lines 5-7] in which the substrate temperature is below the ambient temperature and the ink is above the ambient temperature [column 3 lines 41-49]. Although Stone does not teach the substrate temperature is less than the discharged solution by at least 5 degree centigrade or more, however a *prima facie* case of obviousness exists where the claimed ranges and prior art do not overlap but are close enough that one in ordinary skill in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 f.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See MPEP 2144.05. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of making the surface water repellent as 103 and Nakagawa teach where ink applied to the substrate by method taught by Stone, because Stone teaches it is appropriate to reduce the substrate temperature and increase the ink temperature to print features on a surface.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TABASSOM TADAYYON ESLAMI whose telephone number is (571)270-1885. The examiner can normally be reached on 7:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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